ENGINEERING ROOM
EN 33

ELECTRICITY on the FARM

The National Magazine of Rural Electrification

APRIL, 1943

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THIS MONTH—

Mow Hay Finisher Facts–Design
Electric Brood Brighteners
S-4 Lamps Beat Fish Oil in Neb.
How to Oil Electric Motors
FFA Boy Makes Money in Shop
Beetle Trap from Lamp and Tub
Ways to Stretch Meat
Waffle Baker Cooking Recipes
Vacuum Cleaner Care
"Please Tell Me" Answers
Motor Oiling Chart

A CASE - SHEPPERD - MANN PUBLICATION

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ELECTRIC Hotpoint KITCHENS

How to Get Service & Equipment

ELECTRIC CONNECTIONS.

(WPB Utilities Order U-1-c. Effective Feb. 24, 1943. Supercedes Order P-46-c)

Electric connections may be made to permit operation of farm production equipment: Provided

(a) You possess, can obtain without priorities, or have a preference rating of AA-5 or better for one of the following: (1) water pump for livestock; (2) milking machine; (3) milk cooler; (4) incubator; (5) brooder; (6) feed grinder.

(b) There is no other means of operating such equipment.

(c) The length of the connection will not be more than 100 ft. per animal unit on the farm. Animal units:

1 milk cow	10 beef cattle
30 breeding ewes	3 brood sows
75 laying hens	40 turkeys or geese

or the estimated production for market of

20 feeder cattle	160 lambs (in lot)
30 feeder pigs	250 chickens (not broilers)
600 broilers	

(d) You have not less than 10 animal units.

(e) Lines to be single phase of No. 6 galv. steel wire. (Some exceptions where there is available excess of other types.)

(f) Service wires shall not use more than 30 lbs. of copper.

(g) That your application is accompanied by a certification from your USDA County War Board that you are eligible and the *service will result in substantial increase in production or saving of farm labor.*

Your first move is to get the approval of your USDA County War Board; second apply to electric power supplier for service. No application to Washington or to WPB is necessary. WPB gives utility AA-1 priority on materials for your approved extension without appeal to Washington.

If you have 2-wire, 115-volt service and need 3-wire 230 volts, apply to your electric power supplier.

FARM WIRING.

Wiring for your house, farm buildings and between buildings is available in limited quantities. You have two options in getting it. Find a contractor or local dealer who has supplies on hand and will either install them for you or sell to you. Or, go to your County War Board, get a PD-1A blank, and apply to WPB for a priority of AA-5 or better. You can probably get it for wire for (1) essential repairs, (2) war production. Present your approved priority to your dealer, mail-order house, etc., with your order.

Before ordering new wire, examine your own premises to see if there are some wires which are not in essential use that could be shifted or if the wiring layout between buildings could be changed to shorten runs and give you some extra. Often these changes will improve service.

Nichrome wire for heating elements for brooders, etc., is not available, except that heating elements may be purchased as repair parts without priorities so long as a dealer has them in stock.

BROODERS **INCUBATORS**
SHEEP SHEARS **CLIPPERS**
ELECTRIC FENCES **FEED MIXERS**
DRINKING CUPS **TANK HEATERS**
VENTILATING EQUIPMENT

Manufacturers are authorized under Order L-170 to build this equipment. No priorities or Purchase Certificates are necessary. No steel is permitted to be used for making electric brooder canopies.

WATER SYSTEMS
MILKING MACHINES
MILK COOLERS (n. q.)
SEPARATORS (n. q.)
FEED GRINDERS
CORN SHELLERS
PUMPS & JACKS
IRRIGATION PUMPS (n. q.)
SEED CLEANERS
ELEVATORS
GRAIN BLOWERS
MOST FIELD MACHINES

All of the above items and many others are limited in production under WPB Order L-170 and are distributed to farmers for use under USDA *Rationing Order 3.* The allotment to each area is limited. No priorities are needed to purchase them, but you must get a CERTIFICATE OF PURCHASE from your County Farm Rationing Committee to present to your dealer in duplicate before he can sell to you. The County Rationing Committee decides who can make the best use of the equipment available. Items marked (n. q.) have no limited county quotas. Manufacturers may sell where the demand exists. You need to know where you can secure the equipment before a Certificate of Purchase will be issued.

ELECTRIC MOTORS

(WPB Order L-221)

All motors of one horsepower or over can be purchased only on priority ratings of AA-5 or better, and then only if you have tried unsuccessfully to purchase second-hand motors. Make application for priority on form PD-1A. A letter of approval from the County War Board will help. Present your priority with your order to a dealer or manufacturer. It is best to take the matter up with the dealer or manufacturer first to get the exact description of the motor he can supply to put on your PD-1A application.

A few fractional horsepower motors are still available from local dealers and may be purchased without priorities or certificates. If not available in your area, then you msut follow the procedure above for larger motors.

Some reconditioned, used motors may still be available. Look up "Electric Motors" in the classified telephone directory of any large city.

FOOD FREEZERS

A manufacturer advises us that he is permitted to build food freezers of 26 cu. ft. capacity and larger and to sell them complete with compressor on priorities of A-1-j or better; cabinets only, without compressors on A-9. Fill out a PD-1A as for motors. Smaller sizes available only if dealer has them in stock.

REFRIGERATORS **RANGES**
WATER HEATERS **HEATERS**
SEWING MACHINES **IRONS**
SMALL APPLIANCES **FANS**

Manufacture of all of these items for civilian use is prohibited. Dealers may sell small appliances on hand without priorities. Dealers may sell you a new range or water heater only to replace an old range or heater which cannot be repaired and where no other means of cooking or heating water is available. Repairs for most models of electric equipment are available. They should be obtained from your repairman, dealer, or from the manufacturer of the appliance. No priority or certificate needed.

LAMPS

Common types available from regular dealers. No priorities required. S-4 and S-1 lamps, supply limited. Dealer can order them. Fluorescent lamps and fixtures of 30 watts or less are available without restriction.

WELDING RODS

Welding rods for the repair of farm machinery have recently been granted possible preference ratings of AA-1 obtainable from Regional War Production Boards. It should take only a few days. Use PD-1A application. Order rods from your regular source of supply.

STORAGE BATTERIES

(WPB Order L-180)

A March 6th ruling makes new or reconditioned storage batteries available to farmers for electric fences or other farm uses without turning in an old battery, if a storage battery was not used previously for that job. All that is necessary is to sign a statement to that effect and present it to the dealer.

REPAIRS

Repairs for farm machinery or electrical equipment require no priorities or certificates. Ample supplies for all except discontinued models should be available. Get them through *repair shops, dealers* or the place where you bought the equipment. Write the manufacturer as a last resort.

WPB ORDER L-170

Order L-170 (revision of March 6) is a War Production Board order telling Class "A," "B" and "C" manufacturers how much of different items of equipment they can make between Nov. 1, 1942, and Sept. 30, 1943, and allotting materials from which to make them. Quotas are about equivalent to 40% of 1940 production of new machines and 160% of the average 1940-41 repair part production. *Allotments do not always mean machines.* Manufacturers are given priorities and they then have to wait their turn for steel. The priority now is AA-1. Many manufacturers were unable to get allotted materials in time for production of Spring implements. They may be available for harvesting equipment. The manufacturer is then told by the Department of Agriculture where he can sell the machines.

RATIONING ORDER 3 (USDA)

Food Production Order 3, which replaces Rationing Orders A, B, and C, specifies how the farm euipment manufactured under L-170 shall be distributed. It sets up County Farm Rationing Committees who pass upon farmer applications for equipment. The Rationing Committee is appointed by the County War Board. The Committee issues Purchase Certificates to farmers which authorize dealers to sell to him. Farmers do not need priorities to purchase equipment covered by WPB Order L-170. Purchase Certificates suffice. A farmer may appeal from the decision of the County Rationing Committee to the State War Board.

Original allotments required manufacturers to tag each machine for the county in which it was authorized to be sold. This quickly proved impractical and the State Boards have been given authority to adjust quotas between counties within the state and between manufacturers, depending on location of agents and service facilities.

Go to your County Rationing Committee and to your County USDA War Board with all your equipment problems. It is their job to help you in order to

. . . . . (More on page 20)

Editor's Chat

Lousy

We should be proud of the war production record of our democracy. It is having much to do with our success at arms and the successes of all the Allied armies. Industry, steeped in the democratic process of reward for individual initiative and enterprise, is giving its all to war; a fast, effective job is being done. Agriculture, though misunderstood and hamstrung by Government devised labor depletion and limitations on the machine tools of food production, has responded valiantly. Labor, in spite of being compelled to pay tribute for the privilege of working, and being placed under politically coddled dictatorships, is doing a nice job turning out materials of war. There are some slackers and schemers,—yes; but they are few. The public generally has given up many of its privileges as free citizens to aid the war.

There can be no finer tribute to the people of a democracy than this willingness to sacrifice their rights as individuals for the good of all in the emergency of war.

While sacrificing now, let's strive to keep the flame of freedom alive so we will not be political guinea pigs when peace comes.

A few years ago the social experimenters were destroying the will to work by making "relief" more remunerative than labor. We were confused by the pooh-poohing of thrift and the sugar-teating of labor racketeers and puppet dictators. Now the leveling process continues by batting down the ears of those who have risen to leadership and high salaries through initiative and enterprise. Many are ex-farm boys. The decreed limitation on salaries does not bother me, but it will bother the nation by stifling the incentive of your boy and mine for productive effort. "All men are created free and equal." They remain equal only in a dictatorship. In a democracy they remain free and they rise, depending on their ability to struggle upward. A social leveling process is a downward movement.

Social leaders should know: When everyone is compelled to sleep in the same bed, the lazy, lousy individual does not get rid of his lice. Everyone gets lousy.

Motors

Our editorial pages are being heavily loaded with motor care and protection articles. They are timely. Motors are the most used pieces of electric equipment on farms. They are almost foolproof and carefree. *But*, the busy season is approaching, and a few minutes devoted to learning about those motors now may mean hours and dollars saved this summer.

Hay Finishers

We are pleased to present in this issue a summary of experiences with mow hay curing on a number of Virginia farms. Hundreds of thousands of dollars have been spent in the development of various types of hay driers— some very elaborate and too costly for the average farmer. This mow type "finisher" seems to have proved its practicability wherever it has been installed; and that includes many states, North and South, and from East Coast to West Coast. It is relatively inexpensive. It is simple enough to be built at home. It takes advantage of the best part of field curing. It saves the leaves and green color. The mow finisher uses little metal. Even a blower of reasonable capacity and durability may now be built of wood. The important thing is that the mow finisher saves hay from loss due to rain and gives a higher quality of feed than field curing, even under good conditions, in humid sections of the country. We need that good feed to produce our war quota of milk and meat.

Food Army

We have suggested to Secretary Wickard that experienced full time farm help be given military status, work uniforms and insignia, $1 a year Federal pay and the privilege to carry National Service Life Insurance. Why not? Our soldiers and farm workers are the only $50 to $100 per month war groups we have.

Geo. W. Kable

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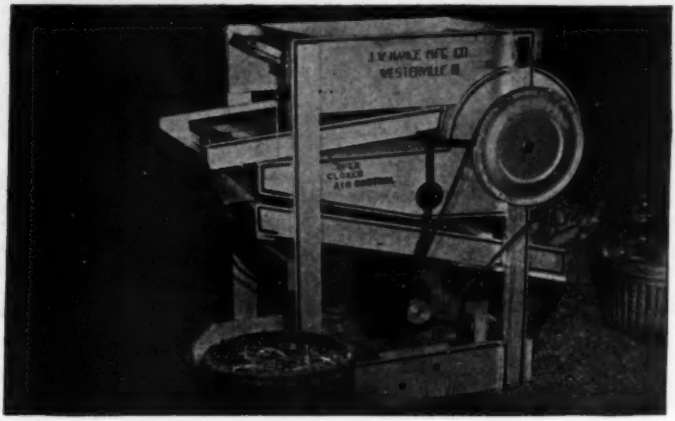
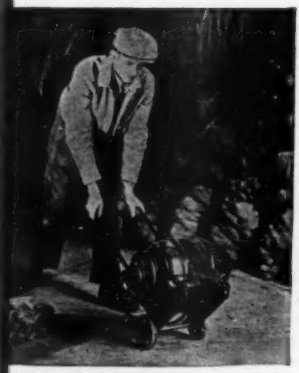
★ WARTIME STRATEGY ON THE FARM ★



LECTRICALLY DRIVEN FANNING MILL *aves you much time and labor, ssures cleaner and more uni- orm seed—bigger and better rops!*

Let electric power pinch hit for man power on your farm



ORTABLE ELECTRIC MOTOR *can be noved from job to job. Saves ime for more productive work n your farm!*

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Westinghouse also offers the "Farm Motors" book which shows how to make small and large electric motors portable—tells how to select pulleys—explains how to take care of electric motors.

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Farm of I. C. Choate, Sugar Grove, had one of the first mow hay driers in Virginia. The blower is in the lean-to feed grinder room with the main duct running along the outside of the barn.

Farmers Enthusiastic Over Mow Cured Hay

Records from Driers on Fifteen Virginia Farms; Comments from Farmer Users; Plans for a Mow Drier. 89.6% of Mow Cured Hay Graded U. S. No. 1 or No. 2 While Only 21.5% of Field Cured Crop Graded No. 2 or Better

By L. L. KOONTZ*

THE total rainfall during any month of the hay making season in Virginia is not excessive, but is made up of numerous light showers which occur at short intervals. A 28 year record shows an average monthly precipitation of 3.2 to 4.3 inches, with rain on 10 to 15 days of each month during the haying season. Field cured hay consequently suffers greatly as it does in many other sections of the country.

Relief from this situation is being brought about in Virginia by the installation of blowers and duct systems for finishing hay curing in the mow.

Mow Curing Prevents Damage From Dew and Rain

In mow curing, advantage is taken of the very rapid drying of the hay in the field during the first few hours after cutting. Mowing is started in the morning as soon as the dew is off the hay. The hay is allowed to dry about two hours in the swath, and is then raked into windrows where it remains for another two or three hours. This field drying for four or five hours on a clear day reduces the moisture content of the hay to about 45 percent. Placing the hay in the drier the same day it is cut prevents damage from dew, rain, and sun bleaching.

In placing the hay on the duct system, care must be exercised to see that it is evenly distributed and uniformly packed. This has been found extremely important in getting the proper distribution of air through the hay. Best results have been observed where the depth of the hay over the ducts has not exceeded six to ten feet for any one curing. After the initial layer has been cured another may be placed on top of it and cured. For best economy and results the total depth of the hay should not exceed fifteen to twenty feet over the ducts.

The blower unit is operated continually during the day when humidity conditions are such that the air will take moisture from the hay. At night, and during rainy days, air is forced through the hay only as needed to prevent heating. This is accomplished by operating the blower unit one hour at six hour intervals. By this procedure hay can be dried to twenty percent moisture content in seven to fourteen days, depending upon weather conditions and the initial moisture content of the hay when placed in the dryer.

Nineteen Mow Driers in S. W. Virginia

The forced ventilation method of curing hay in the barn was introduced in Virginia in 1940. Three systems were installed; one on the Virginia Polytechnic Institute Experimental Farm at Blacksburg, another on the R. G. Stevens Farm near Dublin, and the third on the I. C. Choate Farm at Sugar Grove. Based largely on the results obtained with these driers the number of driers in Southwest Virginia had reached a total of nineteen at the end of the 1942 season. It would have been higher if farmers could have obtained high enough priorities to purchase fans and motors.

In order to check on just how effective and profitable these mow driers had been to farmers in this area, we asked for comments on their experiences from the operators at the end of the 1942 season.

Mr. Choate said: "I have used

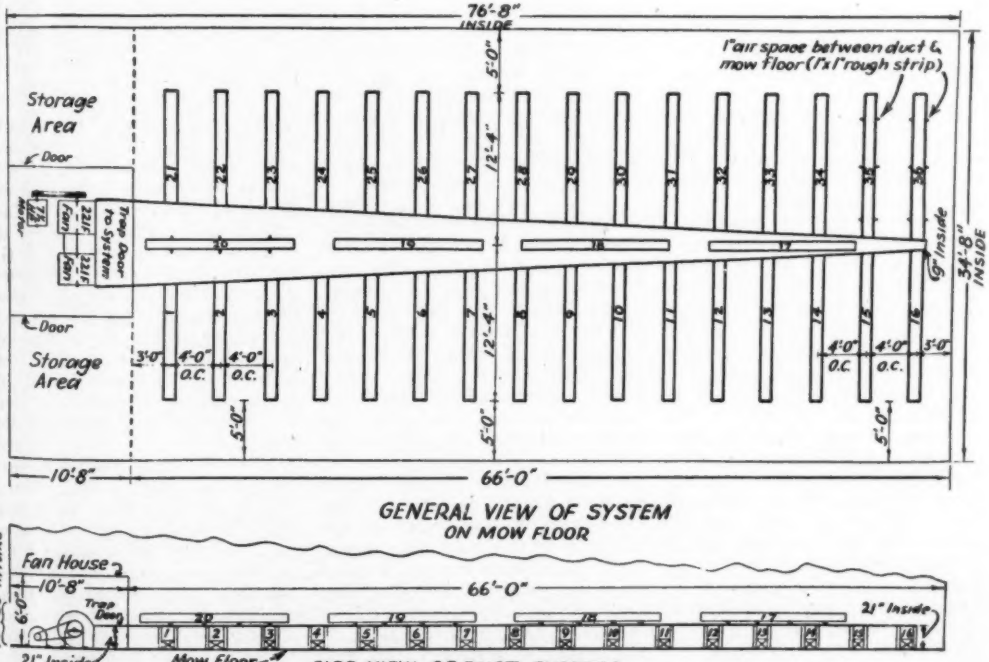
*Mr. Koontz is Division Rural Supervisor, Appalachian Electric Power Co., Bluefield, W. Va.

this drier system three years and I think it has almost paid for itself each year. All the hay that was field cured was dark and damaged. I think I lost one-eighth of my crop that was cured in the field, while there was no waste at all in the barn cured hay. The drier was a good investment and I have recommended it to several others who have installed the system and seem to be well pleased."

One Farmer Preheats Air

Mr. Stevens went a step farther with his system. He installed a furnace and stoker in order to supply additional heat to the air before blowing it through the hay. (ELECTRICITY ON THE FARM June 1941). At the end of the 1942 season Mr. Stevens had this to say—"We specialize in alfalfa hay for sale as a cash crop. We preheat the air before blowing it through the hay raising the temperature about thirty degrees. We do not depend on weather conditions to partly dry the hay in the windrow. Our drier holds about ten acres of alfalfa at a time. We start cutting early in the morning immediately windrowing with a side delivery rake, and follow with a hay loader. By evening the entire ten acres are in the

The hay finisher in this barn of R. G. Stevens, Dublin, Va., is provided with a boiler for raising the temperature of the drying air. The boiler, stoker, circulating pump and blower are all located in the building at the left. The delivery duct between the fan house and barn is filled with hot water radiators. The temperature of the air can be raised about 30° before going through the hay. Mr. Stevens specializes in alfalfa as a cash crop. The hay is put in the barn immediately after cutting.



Plan for a typical blower and duct system for mow hay finisher.

A typical mow duct system in the barn of C. Henry Harman of Tazewell. The blowers are located in one end of the mow and deliver air into the main duct. This duct is 2 ft. high and tapers in width from the blower to the opposite end of the mow. Air comes out from under the sides of the latteral ducts and the rider ducts on top of the main.

drier ready for curing. The time required to dry a batch is from thirty-six to ninety-six hours depending upon dew or moisture in the hay, outside air temperature and humidity. By use of the drier we have eliminated a 25 percent loss in curing and molding. We have no loss of leaves and it maintains a high green color. In fact, the hay inside of the bales when opened is about as green as when cut and for this extra hay we get $5.00 a ton premium. Our outfit cost us approximately $2,500.00 and has more than half paid for itself in premiums alone. We are of the opinion that the labor saved by only one handling pays for the fuel and power."

In the spring of 1941 Mr. H. P. Musser installed a drier on his farm near Salem, Virginia. After two seasons' experience he says: —"There is no question about the barn drying method making a better quality of cured hay. It always has a green color due to reduced bleaching in the sun, and there are more leaves saved because the hay can be brought to the barn before shattering of the leaves takes place. Perhaps the greatest value of the drier comes from preventing damage or entire loss of hay by bad weather. Time and again we have been able to cut hay in small quantities in a period of continuous rain, getting the hay in the drier with only a few hours of field curing, and finishing it in the barn. I cannot emphasize too strongly the tremendous advantage of being able to put half cured hay in the barn and save it from rain damage."

"I cured 358 tons of hay" said C. Henry Harmon of Tazewell. "In my opinion and that of other farmers who inspected this hay, it fully doubled its value by being cured in the driers instead of by the old field curing method. My investment in construction and machinery for the four systems was approximately $1,500.00. I am sincere in my opinion that the investment increased the value of my hay at least $10.00 per ton. I saw hay lying in the fields from a week to ten days that would have been of little value to me, and during this same time, I was cutting and curing mine. I cured hay that was put into the barn with 80% moisture and the lowest moisture content was 55%. It cured almost perfectly. This year was my first experience with soy beans and I was somewhat skeptical whether the drier would do an adequate job. The beans in my estimation cured perfectly. Graded in Washington, the results were U. S. No. 1. I can recommend the forced ventilation method to any farmer and from the experience I have had in curing hay in the field, I don't know of a better investment."

Mr. Harmon is a large dairy farmer. Three of his duct systems are located in one dairy barn 160x36 feet, the other in another barn 80x36 feet. He has three sets of blowers which he alternates between the four systems.

Small Dairies Like Them

Farmers on smaller dairies have also been well pleased. For example, Mr. A. L. Leffell, Shawvers Mill, wrote:

"I installed this year, 1942, in part of my barn a hay drying system size 20x30 feet. The entire cost for the fan and duct system was approximately $65.00. Without this system, I would have lost at least one-half of my hay. The quality of the hay was 100% better than hay cured in the ordinary sunshine way."

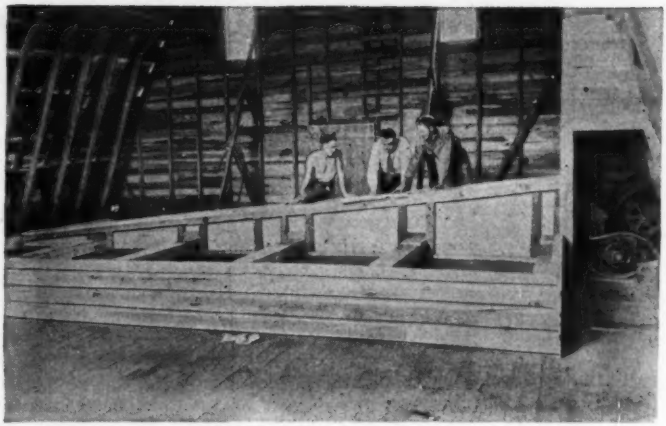
Mr. J. T. Frazier of Chilhowie cut three crops of alfalfa hay from eight acres of ground. It rained almost constantly at each cutting, but he said—"I saved all of it. The labor it saved is an advantage too. Heretofore, I have always had to shock it, stack it, then haul it to the barn; this time I put it on the wagon after raking it up and put it immediately in the barn. Due to the wet weather, the cost of current used in drying the hay was about $1.00 per ton. This was offset by using less labor. Since labor at that time was almost impossible to get, had I not had my electric hay drier I probably would have lost my hay."

R. G. Williams, fruit and dairy farmer of Wytheville, said:— "There is no question in my mind but that the electric drier saves hay. The drier saves leaves which are fifty percent of the value of the hay. They would be lost in sun curing. The drier was put in a barn that was not convenient for us to get to, so it was operated by a hired man who had no experience with a hay drier. We

got some good cured hay anyway, which could not have been done by the field method."

The good hay Mr. Williams referred to in his letter turned out to be U. S. No. 1 alfalfa when graded by the U.S.D.A. He plans to install another system at one of his other barns as soon as he can secure the equipment.

The records on cost of 1942 installations showed a range, depending on the size of the system, of from $80.00 to $350.00. This included lumber, blower unit, labor, electrical materials, pulleys, belts, and one-fourth the value of the motor. Since the motor can be used for a number of other farm jobs, only one-fourth of its value was charged directly to the hay dryer. The cost of the installations varied from fifteen to twenty cents per square foot of mow area.



A. L. Leffel, Shawver Mill, Va., and his son built this small duct system in part of their hay mow. Note how the blowers and motor fit under the slope of the roof, using a minimum of space. Mr. Leffel had the motor on a feed grinder so the system, including the fan, represents a very small investment.

A summary of operating data for the 1942 season is given in the accompanying table. The nineteen systems used a total of 53,265 kilowatt hours in drying 1,005 tons of hay or an average of 53 kilowatt hours per dry ton. Many of the systems were not installed early enough for a full season's operation; therefore, the total tons dried are lower than would normally be expected from the nineteen systems. A considerable amount of this hay was placed in the driers with rather high moisture content, as will be noted from the table. Alfalfa, clover, timothy, mixed field grasses, soy beans, lespedeza, barley, oats, and rye were successfully dried. Better results were obtained where the air flow was fifteen cubic feet per minute or more per square foot of mow area.

Thirty-three samples of hay were sent to the U.S.D.A. in Washington for grading and classification. Nineteen of the samples were from mow driers and fourteen samples were field cured. Of the barn-cured samples 31.6% graded U. S. No. 1; 58% graded U. S. No. 2; 5.2% graded U. S. No. 3; and 5.2% were classed U. S. sample grade. None of the field cured samples graded U. S. No. 1; 21.5% graded U. S. No. 2; 28.5% graded U. S. No. 3; and 50% was classed U. S. sample grade. Analyzing the data further, 89.6% of the mow cured samples graded U. S. No. 2 or better, whereas only 21.5% of the field cured samples graded U. S. No. 2 or better.

SUMMARY OF OPERATING DATA—VIRGINIA HAY DRIERS, 1942

Name	Address	Blower Unit Motor Size—HP	Kind of Hay	Tons of Hay Dried	Per Cent[1] Moisture	Total KWH	Aver. KWH per Ton
R. G. Stevens[2]	Radford	5	Alfalfa	50	70-80	4000	80.0
W. N. Mebane[3]	Dublin	7½	Rye, Alfalfa, Clover, Timothy	70	60-70	2442	34.9
C. F. Richardson	Pulaski	7½	Oats, Barley, Clover	70	60-70	2255	32.2
Claytor Farms	Dublin	5	Alfalfa, Lesp., Soy Beans	39	52-60	3300	84.6
R. G. Williams	Wytheville	7½	Alfalfa	12	55-60	996	83.0
I. C. Choate	Sugar Grove	7½	Timothy, Clover, Alfalfa	46	55-60	1840[4]	40.0
G. C. Umberger	Marion	7½	Alfalfa	35	65-72	3016	83.8
Paul D. McKee	Chilhowie	7½	Alfalfa	50	60-70	4773	95.5
J. T. Frazier	Chilhowie	7½	Alfalfa, Soy Beans	27	60-70	1867	69.1
Gordon C. Felts	Galax	7½	Field Grasses, Alfalfa	35	45-55	1639	46.8
John Moore Phipps	Galax	7½	Alfalfa, Soy Beans	35	45-55	2451[4]	70.0
A. L. Leffel	Shawvers Mill	5	Alfalfa, Clover	15	45-55	601	40.0
C. Henry Harman[5]	Tazewell	5, 7½, 5	Alfalfa, Soy Beans, Clover	358	60-81	18099	50.5
H. P. Musser	Salem	5	Alfalfa, Soy Beans	75	45-55	3000	40.0
VPI (Agr. College)	Blacksburg	5	Alfalfa, Soy Beans	88	45-50	2986	34.0
			Total	1005		53265	53.0

[1]Approximate moisture content of hay when placed on drier. [2]Hot water furnace used to heat air. [3]Twin Duct Systems—only one operated at a time. [4]Estimated. [5]Three sets fans—Four duct systems.

HOW TO OIL ELECTRIC MOTORS

File for reference

Second Article on Oiling. Motors That Require Oil Only Occasionally. Wick Oiled; Wool Packed; Ring Oiled; Ball Bearings

By DR. FORREST B. WRIGHT

THE motors discussed here have bearings so constructed that they hold more lubricant than the bearings of the motors discussed in the first article on oiling. (Last month.) For this reason it is not necessary to oil them as often. However, it is just as important to oil these motors *regularly* as it is any others.

The reader should keep in mind that the instructions given here are intended as a general guide and should not be substituted for any specific instructions provided by the manufacturer of the motor.

Motors used at temperatures below 30° should be oiled with winter grade oil which will not thicken. Such oils are designated as "W" oils, as SAE-10W or SAE-20W. They are obtainable at service stations and are good for year-around use on all motors. Since motors use a very small amount of oil, it is good economy to use only the best obtainable.

It is a good general practice to use the lightest grade of oil that will stay in the bearing. As indicated here grades SAE-10 W or 20 W are heavy enough for all small motors and for some larger ones. Motors larger than 1 horsepower may leak these lighter grades around the bearings. If so, use SAE-30 W.

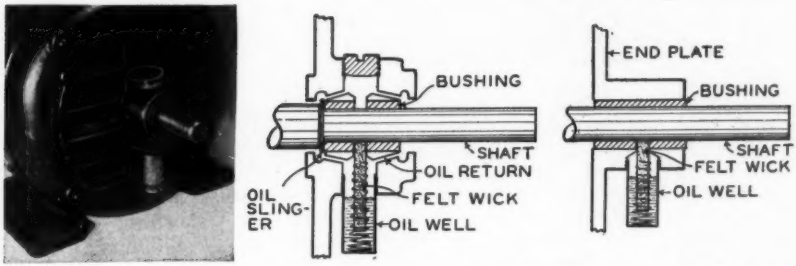


Fig. 8. Every 6 months remove the oil well, pour out the old oil and refill the cup to 2/3rds full. Use SAE 10-W oil for ordinary temperatures and intermittent operation such as driving washing machines, grinders, etc. If the motor runs several hours daily or constantly, re-oil after each 1,000 hours of running time. Center sketch shows construction of a wick-oiled bearing with oil slinger and return passages. Sketch at right is a plain wick-oiled sleeve bearing.

Oil Wick Type Lubrication

Motors similar to that shown in figure 8 have oil wick type of lubricating systems. The function of the oil wick is to carry oil from the oil well to the bearing. The oil well should be filled two-thirds full. If the wick should drop out during the oiling operation, be sure that it is clean and replaced with the upper end through the hole in the bushing and touching the shaft as shown in the sketches. About once a year remove the wick and scrape the glazing off of the upper end of it.

The oil well should always be on the under side of the bearing and as nearly vertical as possible.

The oil slinger (see center sketch) throws oil away from the shaft and into the surrounding groove from which it drains back into the oil well. This prevents oil from creeping back along the shaft and into the motor windings.

Wool Packed Bearings

The motors show in figures 9 and 10 have wool packed bear-

*Dr. Wright is Assistant Professor of Agricultural Engineering, Cornell University, Ithaca ,N. Y.

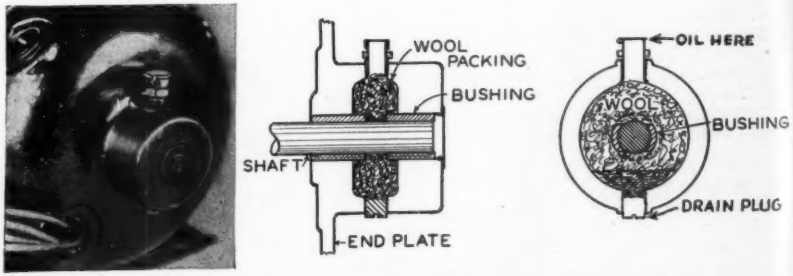


Fig. 9. Wool-packed bearing without overflow. Add 25 to 30 drops of SAE 20-W oil to each bearing once every three months. If the motor is used several hours each day or runs constantly, re-oil after each 500 hours of running time. Remove the drain plug once a year to drain off excess oil.

ings. This type of lubricating system is used extensively on farm motors of any horsepower. A hollow space around the bearing bushing is packed with long fiber wool yarn which touches the shaft at one or more places through openings in the bushing. Oil is added to the wool yarn until it is saturated and a small reservoir of oil remains at the bottom. Some bearings have overflow holes to drain off excess oil. Others having no overflow holes should have the drain plugs removed once a year to drain off excess oil.

The amount of wool yarn, and therefore the oil storage capacity, varies with different motors. For this reason, the frequency of oiling will also vary somewhat. However, if the bearings are well sealed and oil returns are provided, one oiling will last for a long time. In addition to the function of carrying oil to the bearing the wool yarn acts as oil filter so that the bearing is supplied with clean oil.

Oil should not be added to this type of bearing while the motor is running, as the bearing may thus be flooded and oil may be forced into the winding of the motor. It is best to add oil at a time when the motor can stand idle for a few hours to allow the oil to soak down through the yarn and the excess oil to drain off. Keep the overflow holes open.

After oiling, wipe off any excess oil on the outside of motors. If left on the motor, this excess oil will collect dust and dirt.

Oil-Ring Lubrication

Figure 11 illustrates oil-ring type of lubrication. A steel ring is hung on the shaft with the lower part extending down into the oil in the oil reservoir. As the shaft rotates the oil ring rolls over the shaft, lifting oil to the top, from where it flows into the bearing. Obviously, the oil ring must be free to roll or the bearing will not be oiled. Keep the reservoir clean and free from gum and keep it filled with the proper grade of oil. It is especially important with this type of bearing that the "W" oils be used if the motor is to be run where the temperature is below 30 degrees F. Once every two or three years the old oil should be flushed out through the drain hole and fresh oil added.

It is also important that the motor be mounted in a horizontal position. Any tilting of the motor may cause the ring to bind and cease to roll. The oil ring should be examined occasionally through the inspection hole and at a time when the motor is running, to see that the ring is moving and supplying oil to the bearing.

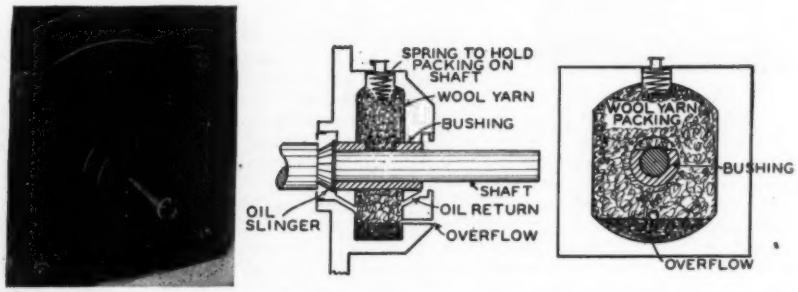


Fig. 10. Wool-packed bearing with oil slinger and return ports. Once each year add SAE 20-W oil slowly until oil appears at overflow hole. This should be done at a time when the motor can stand idle for a few hours to allow excess oil to drain out. If the motor is run for several hours each day, or constantly, re-oil after each 2,000 hours of running time. The shape of wool packed bearings on different makes of motors varies. All have oil-cups or holes with overflows or drain plugs.

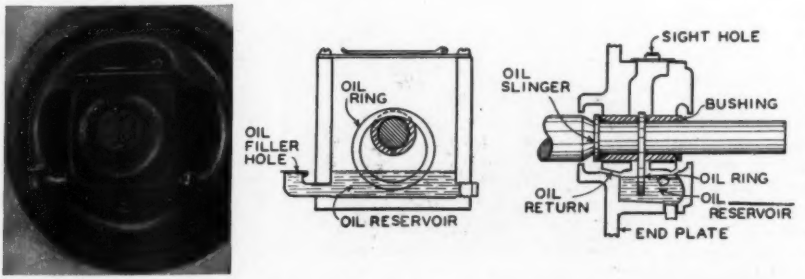


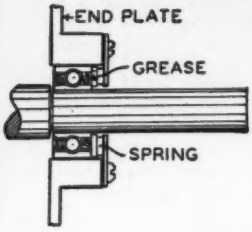
Fig. 11. Ring oiled bearing. At six months intervals, add SAE 20-W oil at the oil filler hole until the level is about 1/8 inch from the top of the hole. Do not add oil at the sight inspection hole or oil while the motor is running. If operated in temperatures under 40° F. it is especially important to use an oil which will not thicken in cold weather. If the motor is run for several hours daily, or constantly, check the oil level frequently. Once in two or three years flush the oil reservoir. Typical of these bearings is an inspection opening at the top and a filler cap on the side.

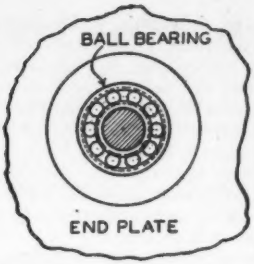
Do not add oil at the top of the bearing while the motor is running as this will flood the bearing and eventually the inside of the motor with oil.

Keep the oil return holes open. A following article will tell how.

Ball Bearing Lubrication

Ball bearings may be lubricated with oil or with grease, depending





Figs. 12 and 13. Grease-packed ball bearings. Every two years repack bearings with ball bearing grease. *Do not use ordinary cup grease.* If motor is run for several hours each day or constantly, repack bearings after each 3,000 hours of running time. Fig. 13 at left is a grease-packed vacuum cleaner motor. The tubes extending horizontally contain the carbon brushes and holding springs.

upon the design of the bearing, speed of the motor, etc. However, the majority of ball bearings used on farm motors are grease lubricated. Grease not only provides lubrication, but also helps to seal the bearing against dust, dirt and moisture. The hard steel balls and races of ball bearings corrode very quickly in the presence of moisture. Also, any dirt in the bearing may soon wear both the balls and the races out of true and cause the bearing to be noisy and to heat.

A common mistake in greasing ball bearings is to add too much grease. The bearing should never be filled more than one-third to one-half full. Too much grease increases the friction in the bearing, causing it to heat. The added friction also reduces the power delivered by the motor.

Grease is applied to ball bearings by one of two methods. Either the bearing is packed with grease and sealed as is the case of the bearing shown in figures 12 and 13 or grease fittings are provided as shown in figure 15, for pressure lubrication.

As a rule, ball bearings need to be re-lubricated only once in two or three years. In some cases where the machine runs only a few hours a year, as is the case of the vacuum cleaner and a few water pumps, the manufacturer recommends no lubrication for the life of the machine. As a general practice, however, ball bearings should be re-lubricated at least every two or three years.

At least one manufacturer builds a motor with grease packed ball bearings (figure 14) having enough grease to last for 5,000 hours of operation. It is necessary, however, to add 8 to 10 drops of light oil (SAE 10) to the bearing once each year to soften the grease. Do not add more than this amount of oil.

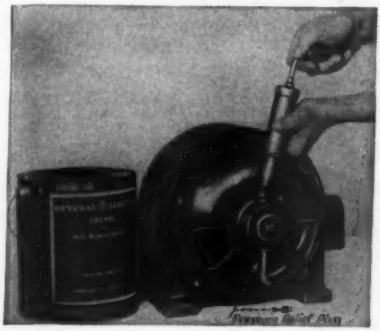
Ordinary cup grease should not be used in ball bearings. Use a good grade of ball earing grease or, on very small motors, unmedicated vaseline. In some cases the manufacturer recommends a very special grease. No other grease should be used on such a bearing.

To re-lubricate a sealed type of ball bearing:

1. Remove the bearing and clean out all of the old grease. A mild solvent such as kerosene, carbon tetrachloride, Varnaline or other cleaning fluid is good for washing the bearing. Do not use paint solvents. Extra care should be taken to see that the bearing is absolutely clean and dry after washing.

(More on page 23)

Fig. 14. Grease-packed ball bearing with "softener" oil hole. Add only 8 or 10 drops of light oil (SAE 10-W) once each year.



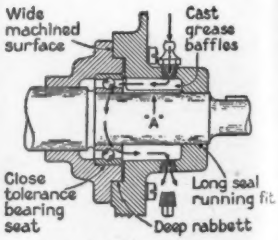


Fig. 15. Ball bearing with grease-gun lubrication. Once in two years, (1) wipe the bearing and grease fittings clean; (2) remove the pressure relief plug; (3) make sure that the pressure relief hole is free of hardened grease; (4) apply grease with the gun until fresh grease appears at the relief hole; (5) before replacing the plug run the motor for a few minutes to allow excess grease to escape from the bearing; (6) replace the pressure relief plug. This bearing is made with grease guide baffles which forces the clean grease through the bearing, pushing out the old grease.

Brood Brighteners

Some Additional Experiences of Our Readers with Electric Brooders. Prize-Winning Letters Submitted in January War Production Contest.

Yes, We Have Roosters Today

• Dear Folks: Yes we know that day-old chicks don't roost on sticks; that is they didn't before Pearl Harbor. But these Front Cover chicks belong to the PEEPS (Produce Eggs Early, Priscillas), an auxiliary of the CROWS (Claude's Roosters of War). They are stepping up production. Hatched in an electric incubator, brooded for a day with safe and sanitary infra-red, and given a shot of ultra-violet, they chirped "shoot photographer and be quick before we have to go and lay eggs." They're cute and they're war workers.

ART EDITOR.

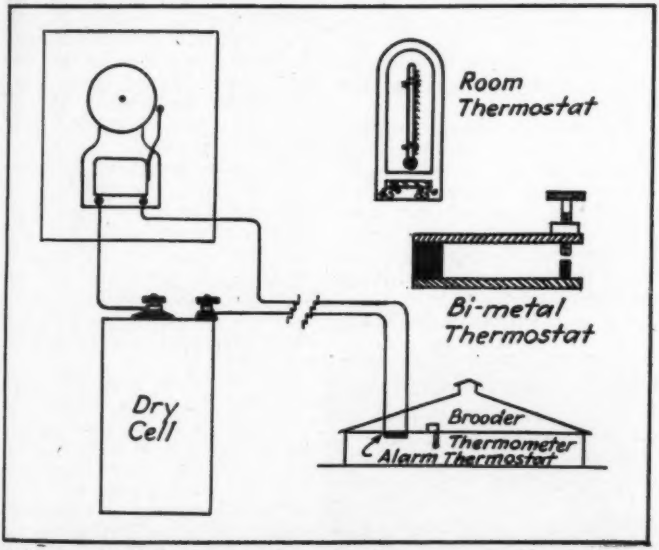
Chicks Care for Themselves While I Work Out

• When the government asked for more poultry, we decided that with our electric brooder we could raise 600 instead of our usual 500 chicks.

I work away from home a lot so must keep my chores as simple as possible; but 10 minutes each morning gave me time to refill feeders and fountains and raise up the brooder to see if any had perished.

Many people ask, "What happens to your chickens if a sudden shower comes up while you are away?" The answer is, "I don't know. I never went home to see and I have *never* had a drowned chicken." Experience has taught me that if that warm place is always there, they scurry under the brooder when anything unusual comes so I presume they go there during a shower.

I sold 90 roosters on June 23 or two days before they were 11 weeks old. For these I received $32, which at 20c a lb. meant they averaged 1¾ lbs. From then until July 11th, I sold 250 roosters weighing 1¾ lbs. to 2¾ lbs.



A diagram of Mrs. Desgranges' temperature alarm set-up. The low temperature alarm thermostat is placed near the thermometer under the hover. It may be of the house temperature control type (upper right) costing around $12 or may be a bi-metal strip thermostat (low temperature contact type—center right), costing about $1.50. Bell cord wires are run from that thermostat to a dry cell and door bell located in the kitchen or bedroom. Similar alarm systems are available which will ring a bell when the power goes off.

Here are my figures—

250 roosters sold	618 original chicks
150 pullets sold	603 raised
175 hens in laying house	—
	15 lost
28 eaten	

Quality? Those 150 pullets were sold for hatchery stock at $1.10 and after being tested for this, that, etc., only 7 were culled out. From those 175 layers, I gather between 10 and 11 dozen eggs daily.

The first year I used an electric brooder I had a separate meter and used 217 kilowatts to brood 500 chicks. In our locality that means $4.34. It shouldn't require any more for 600, if as much, since their body heat would be greater.

MRS. JOHN DESGRANGES,
R.R. 8, Defiance, Ohio.

Temperature Alarm Makes Electric Brooding Tops

• Having brooded from 250 to 1,000 chicks each spring for 19 years, I think we have experienced all the grief to which poultry raising on a family-size, diversified farm is subject. To keep four hard coal stoves going properly we literally have gone to bed with the chickens in severe weather.

When electricity became available four years ago, one of our purchases was a 500 chick size electric brooder. That brooder used for 250 chicks in a round house 10 feet in diameter was just pure magic! Clean, steady, dependable heat, freeing me from hours of watching and literally miles of running down to the brooder house. And at about one-fourth the cost of coal for fuel. Coal cost annually about $15 per stove, while the electricity costs about $4 per season.

My troubles with brooder stoves were definitely at an end, and I enjoyed peaceful nights, until the third day of the second season with the electric brooder. That morning there were dead chicks in every direction. The thermometer read 46° instead of 95°—the heating unit had burned out during the night. The chicks were gone as well as my confidence in electric brooders. But our local electrician now has made electric brooding as near foolproof for us as it can be. He built for

us a signal system to warn of low temperatures in the brooder house, that I feel should be a part of every electric brooding outfit.

This simple battery alarm system is independent of the high line power and will warn of falling temperatures from any cause. It paid for itself last spring when the brooder cord became accidentally disconnected about 11 o'clock one night.

Having this dependable alarm system, nothing short of necessity could induce me to change from electric brooding. Chicks definitely grow more uniformly because they are comfortably warm, there never is any crowding, and with all-night illumination from the pilot light, they can and do eat and drink much more than without light. We feel, too, that the red pilot light decreases the tendency to picking and cannibalism.

Electric brooding seems the ideal way and releases the caretaker's time for more chicks, gardening, or other means of adding to food production.

MRS. L. A. ABBOTT,
R.F.D. 1, Morrison, Ill.

No Auxiliary Heat Needed in Kansas

• We have operated electric brooders for six years and find this to be the most efficient and successful method of brooding. Two 500 chick capacity brooders are operated in a 14 by 18 foot brooder house from the last week in March through April without additional artificial heat. We place four hundred chicks under each brooder and separate them for a short time by a temporary partition. The brooders rest upon bases which are covered with coarse hardware cloth so that the droppings will fall through.

We have found electric brooding to be very desirable from the standpoint of current consumption, elimination of fire hazard and livability of chicks; and the initial cost is no greater than that of other brooders. The average cost for heat is slightly more than one cent per chick. There is no loss from chilling or overheating and since the heat is evenly distributed there is no crowding which might result in smothering. The wire covered bases provide sanitation and the problem of coccidiosis is solved.

The chicks learn to eat and drink within a few hours and by using the attraction lights the growth is much more rapid and the feathering is much earlier. Cannibalism is completely controlled.

After the brooders are set for operation frequent attention is not required and there is no labor of carrying fuel and ashes.

FRANCES MCCUNE,
Formoso, Kansas.

Electricity Takes Drudgery Out of Brooding

• My electric brooder is my hired help and is so efficient it cuts my labor of brooding chicks twenty percent. No labor is required to store or handle coal or ashes or to hold constant temperatures, regardless of weather changes. Worry and useless trips to the brooder house during the night are eliminated.

The electric brooder takes the drudgery out of brooding chicks and it is economical to operate.

The electric brooder does not use up oxygen from the air nor produce harmful gases and is not a fire hazard. It has long life, low upkeep, automatic operation and is portable, making installation, cleaning, removal and storage easy.

The electric brooder is designed for cold-room brooding which produces quicker feathering, faster growth; and conditions are so natural and so perfect that mortality is practically nil. Electric brooded chicks mature fast and are of the best quality and bring the highest market price.

MRS. K. M. WEBB,
Allisonia, Va.

Best for Busy Farm Wife

• April 6, 1942, I purchased an electric brooder, 500 chick size, remodeling part of an old granary for a brooder house.

I never owned a brooder before and, in fact, did not know much about chicken raising. After a day with the electric brooder, I found I didn't have anything to worry about. April 20, 1942, I purchased 350 Triple A White Rocks. On June 8th, I moved them from the brooder house and put in 500 White Rock Cockerels. Time saved, chicks saved, and profits speak for themselves.

Cost of *all* equipment, feed, etc., $206.65. On November 1, 1942, chickens sold $249.64—Cash $42.99—130 pullets valued at $1.35 each. All equipment paid for—all the fryers for our own use during the Summer. And as I write this, the pullets are laying good, doing their bit for Uncle Sam and the brooder is ready for action again. I'm a housewife on a farm of 400 acres, so I did not have much time for chickens.

MRS. WILSON BEAVER,
R.R. 1, York, Nebr.

Cultivation by Fire

Flame cultivation, a new way of fighting weeds, is the invention of Price McLemore, an Alabama planter, now a Major in the Army Air Corps. The new cultivator is a home-made affair with a flame thrower staggered on either side of the row directing flames toward the ground. The flame is not hot enough to harm the thick lower parts of the stalks of cotton, cane and corn on which it has been used, but is hot enough to blight the small weeds.

The cultivator uses two burners of existing commercial pattern, fed ordinary fuel oil pumped under pressure. It spreads a sheet of fire close to the surface as a tractor pushes it along.

The flame treatment does not instantly burn the weeds to a crisp, but after a short time their leaves and green stalks wilt and in a few hours they are dead. It not only kills the weeds between the rows but between the plants in the rows. It also puts a fiery finish to any insect pests on or near the ground.

It is said there is an advantage in killing the weeds without uprooting them as the roots left in the soil continue to serve as binders against soil erosion. Scientists from the USDA state that from preliminary reports on cane fields treated, there was little difference in yield between flame cultivated and conventional method.

Condensed from Science News Letter, February 13, 1943

★ ***Buy War Bonds*** ★

S-4 Lamps Beat Fish Oil in Nebraska

Bulletin No. 344 recently issued by the Agricultural Experiment Station, University of Nebraska, Lincoln, Neb., gives the results of three experiments in using S-1 and S-4 sunlamps on Leghorn pullets in comparison with control pens without sunlamps but with fish oil added to the feed. Records were kept of eggs laid, mortality, number of birds culled, egg size and hatchability. Sunlamps were used two hours per day. They were placed 60 inches above the floor and over the feed hoppers or water pans.

In each experiment the irradiated pullets produced a few more eggs than those fed the fish oil supplement. The mortality and the number of birds culled was considerably less in the sunlamp pens than in the check pens. Hatchability of eggs from the irradiated pens was higher in each of the experiments, averaging about two per cent higher. The size of the eggs was apparently little affected by the two systems of providing vitamin D.

The cost of the two systems is of special interest. The fish oil cost about 5c per hen for the 121 days of the test. With the S-1 lamps and electricity at 3c per kw-hr, the electricity cost was about 3c per hen for 121 days; lamp replacements cost about the same or a total of 6c. The electricity for the S-4 lamp which uses only about one-fourth as much as the S-1, cost 0.87c per hen for the 121 days, but the S-4 lamps which cost $8.50 gave a lamp cost of about 2c, or a total of something under 3c per hen for the 121 days.

May Beetle Trap

By A. DEAN

MR. AND MRS. BUNTON sat on their porch near Greencastle, Indiana, enjoying the cool evening air. It was the last week in May and it had been a hot day. The rose garden and the persimmon tree were beginning to look beautiful.

As they sat, they heard an ominous buzzing! "That's those beetles again!" said Mr. Bunton. Last year, the May beetles completely defoliated the persimmon tree and they didn't have any of Mrs. Bunton's fine persimmon puddings. "We'll call the entomologist who was out here last year. Maybe he can do something about it. He said he'd like to see the beetles in action.

When the entomologist arrived he said, "We'll fix those May beetles! I'll be over here tomorrow evening early!"

The next evening he came with a big wash tub with a piece of bright tin soldered to one side to form a reflector. There were also several hundred feet of electric cord and some light bulbs.

The electric cord was attached to the porch socket. He and Mr. Bunton filled the tub half full of water and put it under the persimmon tree. He placed a 500 watt bulb so that the light was

reflected into the water. Very soon, they heard a "plop!"; then another and another! The beetles would hit the reflector and fall into the water. Before long, the entire surface of the water was covered with beetles. They were scooped out in great handfuls. They clung together like great bunches of grapes.

Over two thousand beetles were caught that evening. The trap was kept on all night, and the foliage was saved.

Do You Know All the Answers

Here is a little quiz to test your skill in the use and care of vacuum cleaners, and to remind you of points you may already know but have neglected to practice.

One hundred points is a perfect score. Take off ten if you miss a question that applies to your cleaner. If your score is 90, pat yourself on the back. If it is 70 or less, you should help your cleaner to help you more. And if your score is below 50, . . . you ought to know better!

Answers on Page 18; don't peek!

1. Does it make any difference how close to the rug you set the nozzle of the cleaner? . . . .
2. Do you let the cleaner pick up nails, buttons, hair pins, tacks and the like? . . . . . .
3. How often do you empty the dust bag? . . . . . .
4. How do you clean the bag? . . . . . .
5. If the cleaner has a brush, what care and adjustment does it need? . . . . . .
6. What do you watch for about the belt? . . . . . .
7. How do you handle and store the electric cord? . . . . . .
8. What is the best way to dust walls, shelves, and picture frames? . . . . . .
9. How would you use your cleaner on draperies, upholstered furniture, mattresses, and pillows?
10. Can you clean radiators and other hard to get at places with a vacuum cleaner? . . . .

Electrical Housekeeping

Edited by **GAIL MEREDITH**

Ways To Stretch Meat

IT takes no prestidigitator to turn one pound of meat into two. That is a trick most any housewife can do with one hand in her apron pocket. Of course the two pounds aren't all meat, but they have its fragrance and flavor, and such combinations have long served to round out many an unsuspecting meal when money or meat was scarce.

Scrapple

There is scrapple for instance. Cooks in southern Pennsylvania used to make it with corn meal and fresh pork at butchering time and freeze it so it would be ready for use any time during the winter. This recipe calling for whole wheat is particularly recommended to increase the supply of foods that furnish Vitamin B.

1 pound ground cooked pork
3 cups cracked whole wheat
6 cups broth from pork
3 teaspoons chopped onion
2 teaspoons salt
¼ teaspoon black pepper
½ teaspoon poultry seasoning

Cook the cracked whole wheat in the broth from the pork for one-half hour. Combine the pork and the wheat, add the seasoning, and mix thoroughly. Place in a mold which has been rinsed with cold water. When the mixture has set, cut into thin slices and brown in fat in a frying pan.

The cooked pork can come from any bony cuts of meat. My husband's mother used to chop a pig's head in pieces and cook it until the meat dropped off all the irregular bones. The meat from the forehead and jowls went into scrapple each fall.

Porcupine Balls

Making porcupine balls is a good way to extend a pound and a half of ground beef considerably. Select beef from the neck, the shank or plate and have it ground. Add to this half a cup of uncooked rice, a tablespoon of grated onion, a teaspoon of salt, and an eighth of a teaspoon of pepper; then mold the mixture into little balls. Empty a 10½ ounce can of tomato soup into a kettle and add an equal amount of water. Heat it and drop in the balls. Cover the dish and cook slowly for an hour.

Vitamins in Lamb

If your family has never learned to enjoy lamb, you might begin coaxing them to eat it with stew and dumplings. Lamb is rich in those vitamins that put a gleam in your eye and dash and sparkle in your bearing. If it is waiting to round out the children and fill them with zest for living, it should have a chance at anyone's table. Beside, apparently less lamb is being shipped abroad than many other meats so there is going to be more of it left for us at home.

Have two pounds of lamb cut in cubes. Brown these pieces in a frying pan, then put them in a casserole. Add a quarter of a cup of butter, two onions, and cook for a short time. Then add a cup of carrots, a cup of celery, salt, pepper, paprika, and three to four cups of hot water or better still, broth. Cover the casserole and cook for two hours.

About a quarter of an hour before dinner time, mix up your favorite dumplings and drop them by tablespoonfuls into the boiling stew. Cover closely and let them cook for twelve minutes.

Baked Liver Rolls

Baked liver rolls make another casserole dish you can be proud of.

2 tbsp. butter
1 cup cooked rice
2 tbsp. chopped onion
2 tbsp. chopped parsley
4 large slices of liver
1 cup strained tomatoes
½ tsp. salt
bacon strips

Melt butter in your frying pan. Brown onion, then add parsley, rice and salt. Mix well and spread over the liver slices. Roll up, wrap each slice with bacon strips, skewer or tie with a cord. Brown rolls in hot fat in frying pan over medium heat, then season with salt. Place in a casserole with a cup of strained tomatoes. Cover and bake for one hour at 350 degrees. If the family likes it that way, serve with a tomato sauce.

Have you started a special file for wartime dishes that will feed your family well, but will go easy on rationed foods? I think you will find it pays. You may have to put a little more imagination into your meal planning to get along with less meat, but what if you do? Imaginations aren't rationed.

Window Cleaning

Many women hold firmly to the same way of washing windows year in and year out. But there are some of us who feel after each bout with an acre of windows, well, maybe, not an acre, if you're fussy about exactness—that there must be a better way of doing this recurrent task. So for all you people who are inclined to put off doing the windows, I've been going about asking folks how they manage to keep their windows clean.

Uses Vinegar Solution

One good housekeeper told me she always washes windows with vinegar. She uses one quarter vinegar to three-quarters water. She says this cuts right through the smoky, greasy film on the glass. She washes one pane at a time and wipes it dry at once.

Another friend uses ammonia in the wash water.

"How much?" I asked her.

She just shook her head. "I don't know. I just dump it in till my eyes smart. If the windows are very dirty, I wash them off with clean water, then I wash them with the ammonia water and polish them afterwards with lots of clean cloths and lots of elbow grease."

Expert Uses Ammonia

Then in the hope that somebody might have invented a way I'd never heard about to do this tiresome job, I called up the Home Economies Extension Department at the University of Wisconsin and asked Mrs. Margaret McCordic what she was recommending for window washing these days.

She uses ammonia, too, but she measures the ammonia she uses.

"Soften the water first," she recommends, "then add one tablespoon of ammonia to a couple of quarts of water. This isn't enough to have any effect on your hands. If you can keep the water hot, the job will be easier because the windows will dry much faster."

Mrs. McCordic likes to use a

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chamois or a sponge for washing the windows because they do not carry as much water as a cloth. Then she wipes the windows and polishes them with plenty of dry, clean cloths.

"Ammonia is becoming harder to get," Mrs. McCordic said. "It is likely that we'll still be able to get it this spring, but probably not much longer. When you can't get ammonia, go down to the creamery and buy some of the tri-sodium phosphate which dairy operators often use for cleaning. It is not a soap, but an excellent cleaner. Soften the water, keep it warm, and use this as a cleaning agent. You can buy it packaged under a trade name, but it will be cheaper if you can buy it at a milk plant."

Wafflese Cooking

If the accomplishments of your waffle iron begin and end with waffles, you are missing an easy way to do some fancy baking very easily. I have seen good cooks make omelets and short cakes on a waffle iron. I've seen them bake

brownies, gingerbread, and pie crust.

This isn't a trick; it is merely making good use of equipment at hand to put old foods into new dress, or give a meal an added fillip by serving a part of it piping hot just as it is baked.

When you do start out with this extra baking, be sure to use a recipe you can trust. If the batter for any sort of waffle is too thin, it may stick; if it is too thick, the waffle is bound to be a little on the tough side. With recipes that make an especially rich batter, set the heat low on the waffle baker. Take the cookies or cake out as soon as they're done, and, if you aren't going to serve them at once, when it is out of the baker and onto the plate, of course, put them on a cooling rack just as you would if you had baked them in the oven.

From embarrassing experience a lot of us have learned that it is easier to keep all the batter on the grids if we pour it from a pitcher instead of trying to dip it out of a bowl a spoonful at a time.

In the interests of variety save scraps of pastry to bake on the waffle iron. Save half of a cake batter, and bake it like waffles, half a cup at a time. Beat an egg in milk, and add some melted shortening for a plate of french toast, corrugated french toast, crisp and different.

Ordinarily all the care you have to give your waffle iron is to wipe off the edges of the grids with a clean dry cloth. If there is batter spilled on the outside, wash it off with a damp cloth and then polish the surface with a dry one. Never put the waffle baker in water. Remember the socket for the electrical connection, and the wiring are on the inside.

If, because the iron wasn't hot enough or there wasn't enough shortening in the batter, a waffle does stick, brush out the particles with a wire brush. Then grease the iron the next time it is used.

Leave the iron open until it is cool. This will help prevent discoloration. Do not overheat the iron. But if, in the unfortunate chance that you may have let it get badly discolored, don't let that discourage you. A paste of water and baking soda, put on with a soft brush, takes off the grease and discoloration. After this cleaning, too, you'll have to grease the waffle iron before you use it again.

Chocolate Brownies

½ cup butter
2 squares chocolate, melted
½ teaspoon salt
¼ teaspoon cinnamon
⅞ cup sugar
2 eggs
1¼ cups pastry flour
1 tsp. vanilla

Cream butter and sugar. Add chocolate and beaten eggs. Sift dry ingredients together and add; then add flavoring. Drop a tablespoonful on each section of the iron. Bake about three minutes. For a very special dessert put ice cream between brownies.

Baking Powder Biscuits

2 cups of flour
4 teaspoons baking powder
1 teaspoon salt
4 tbsps. shortening
1 cup milk

Biscuits that are to be baked on a waffle iron, may be softer and richer than when baked in an oven, hence the large quantity of shortening and liquid.

Preheat the iron about six minutes. Drop a spoonful on each grid and bake about three minutes. Serve hot.

Vacuum Cleaner Answers (*See Page* 15)

1. Yes. Unless the cleaner adjusts itself automatically to rugs

of varying thickness, you should adjust the nozzle according to the manufacturer's directions for the best results. A cleaner without a

motor driven brush must fit tight to the rug in order to suck up the dirt. A cleaner with a revolving brush should be set high enough to lift the rug slightly as it cleans.

2. No. I pick them up by hand so they will not injure the belt or the fan, or passing these two, punch holes in the dust bag.

3. Once a week. The cleaner cannot do good work if the bag is clogged with dust.

4. Empty the bag carefully on an open newspaper. Once a month turn it wrong side out and brush it thoroughly. If you have a hand vacuum cleaner use that to get all the dust from the fabric. Never wash the bag. Washing removes the filler that helps to make it dust proof.

5. Look over the brush now and then and remove any hair or thread that maybe wound up on it. Lay a straight edge across the nozzle and see that the bristles extend a little below the bottom of the nozzle. As the tufts wear off, lower the brush if it can be adjusted. When the tufts no longer brush the rug, put in a new brush.

6. Keep the spindle on which the belt runs free of string, ravellings, and hair. Guard against cutting or nicking the belt with sharp objects. Replace the belt when it loses its elasticity enough to become slack.

7. Never kink or jerk the cord. Always detach it from the socket by pulling the plug and not the cord. Wind the cord loosely around the hooks on the handle, or about the runners, if it is a barrel type cleaner. The point is not to bend the wires sharply.

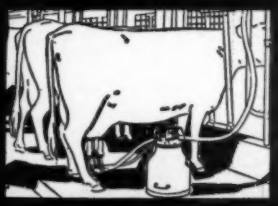
8. Use the dusting brush attachment on the end of an extension tube or hose.

9. Use the narrow mouthed drapery nozzle or the soft furniture brush.

10. Yes. The long flat tool with the narrow slot opening is specially designed to clean radiators. It is equally good to clean out any cracks, or crevices in closets, or hard to reach corners.

The longitudinal shrinkage of *wood* is only about 1/100 of the transverse shrinkage.

YES



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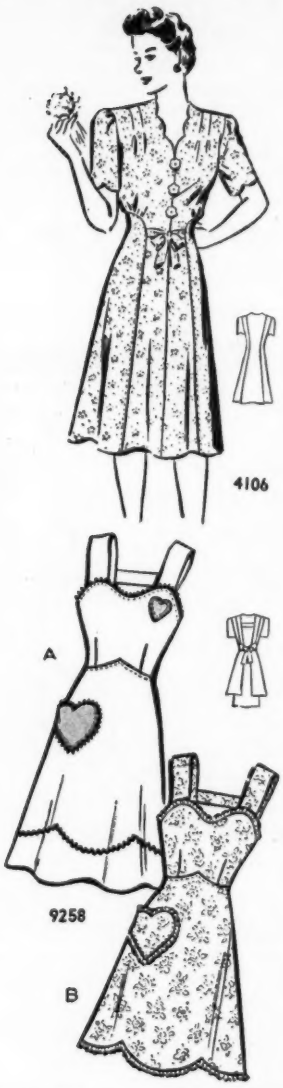
Dress Patterns



Pattern 4106 . . . A slim-illusion frock for matrons—the high, curved side-front skirt sections and the back panel are flattering. Sizes 34 to 48. Size 36, 4¼ yards 35 inch fabric.

Pattern 9258 . . . Protect your good clothes with this neat and cheery apron, shown in two gay versions. The pointed front waist-seam gives smooth lines. Sizes small, medium and large. Small size, 1⅞ yards 35 inch fabric and ¼ yard contrast.

Price of each pattern 16c (in coins). Send orders to ELECTRICITY ON THE FARM, Pattern Dept., 243 W. 17th Street, New York, N. Y. Allow plenty of time. Mail is slow these days.

FFA Boy Makes Money in Electrified Farm Shop

By JACK BAKER,
Midlothian, Texas

I devote every moment of my spare time to rebuilding or reconditioning old bicycles, velocipedes and scooters in father's farm electric workshop. Now, more than ever, it has proved very profitable, and I have more work than I can do as I am still in high school and have considerable studying to do.

Gets Fun From Work

Since father taught me how to use his electric welder and some other equipment, I get so much fun out of my work that there are not enough hours in the day for me. I get much help and inspiration from ELECTRICITY ON THE FARM. I have gradually worked up a profitable business, so good, in fact, that I usually have several orders ahead for bicycles. I started last year by inserting a small three-time advertisement in our local paper, stating that I would pay cash for old bicycles or bicycle parts. First insertion brought me 12 bicycles, several grames, and some old parts. I pay from 75c to $4.00 for old bikes, depending on condition.

Rebuilds Bicycles

In making up a bicycle, I discard all broken parts that can not be welded and made good as new. I purchase rims and other parts when necessary, and make wheels by fitting in the spokes myself, adding whatever new parts are required before repainting in attractive colors and assembling. When I get through with it, it looks like a new bicycle, and I guarantee all welded parts to be strong as new. I sell these bicycles readily at $8.00 to $15 each. The demand at present is greater than I can supply. I purchase all my supplies wholesale, and my profits on each sale range from $5 to $8.50. I also repair, or recondition kiddies' scooters, bikes and velocipedes, and there is also a great demand for these, too, just now, and a nice profit.

I belong to the Future Farmers of America, and devote only my spare time to rebuilding or reconditioning old bicycles, as I must work harder than ever on planning farming activities so as to increase the amount of food. In addition, with the help of our electrically equipped farm workshop, I am doing all I can to help bring every piece of equipment on our home farm up to top performance.

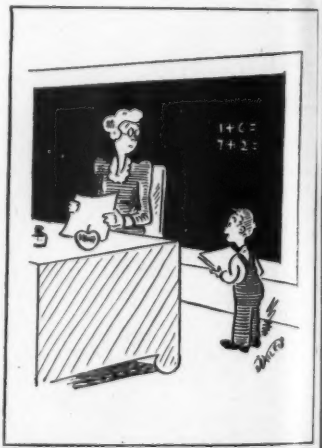
Service and Equipment

. . . . . (Here from page 3)

keep up production. They are probably as well informed as anyone you could appeal to. They make the interpretations and applications of the rules.

PD-1A FORMS

These are the forms on which you must make application to WPB for any equipment for which a priority is necessary. Your County War Board has the blanks and will help you. All the questions must be answered. Some of the answers may be "Does not apply." By a recent arrangement, these blanks are no longer sent to Washington, but may be submitted to the nearest of the 131 District WPB offices and priorities can be assigned by one of the 12 Regional Offices of WPB for materials valued at $100 or less.



"In this problem about a farmer plowing a field, which problem do we solve? How big is the field or where does he get tires for his tractor?

Self-Ejecting Ice-Cube Tray

A patent has recently been issued on an ice tray that ejects the ice cubes automatically. Each ice cube is frozen in a corrugated cup made of two metals similar to some brooder thermostats. One metal shrinks faster than the other as it gets cold. The result is that the metal cup pulls away from the ice after it freezes. Not on the market.

Have Milk Coolers Ready

One thing we all have to keep in mind all of the time is this: milk is just as good a food for bacteria as it is for mammals, and if bacteria get it first, it is not so good for us. It is possible to keep most of the bacteria out of milk by being as clean and careful as possible in all the various operations, but it is not possible to get rid of all of them; so the next best thing is to keep the milk cool so what bacteria there are can not multiply so fast. Milk ought to be cooled down to 50-55 degrees within an hour after it is drawn and the best way to do this is to have an electric milk cooler with a circulating pump to keep the water circulating around the cans. If you are so fortunate as to have plenty of good, cold spring water, that is a help and leaves less cooling work for the electric motor to do, but very few springs or wells are cold enough or flow fast enough to do an adequate job of cooling, and need to be supplemented by a mechanical cooler or at least a few cakes of ice.

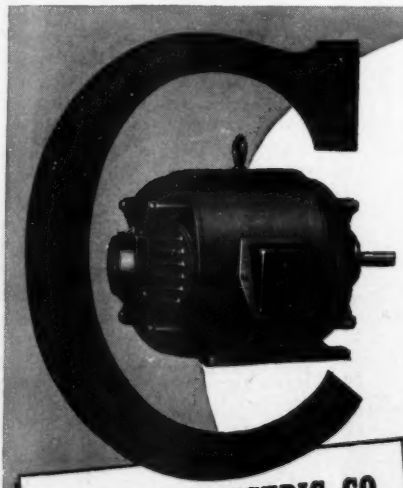
Ed. Mitchell, WGY Farm Advisor

"When there's a blackout our Air-Raid Warden doesn't waste words."

Rubber Now Made From Soybeans

Norepol is a new rubber-like material developed at the Northern Regional Laboratory of the USDA at Peoria, Illinois. It is made from the fatty half of soy bean oil, the other half going into glycerine for explosives. Norepol is not a full substitute for rubber as it has only about one-third as much stretch and one-sixth as much strength. It is good, however, for such things as jar rubbers, rubber heels, etc. Two companies are now making Norepol under their own trade names.

Grindstones cut from sandstone blocks are still in demand because they are better for certain industrial purposes than any of the new artificial abrasive grinding wheels.



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The tough jobs — on thousands of farms — formerly requiring hand labor, are seldom thought of as such since Century Motors were installed.

They're especially well adapted to farm use—developing high starting torque to start the toughest loads, yet using less starting current and producing least light flicker.

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By JEROME J. HENRY

Editors Find American Way Is Good

On New Year's Eve, 1942, the National Broadcasting Company welcomed in the new year of 1943 with a coast-to-coast broadcast on which editors of newspapers from coast to coast spoke to the people about the war and the peace to follow. Some of the messages were so effective and forceful that NBC, at the request of many listeners, has issued a small booklet in which the speeches are preserved in permanent form.

Some of the paragraphs which appear are worth repeating. For instance, Erwin D. Canham, managing editor of the *Christian Science Monitor,* said, "Our soldiers and sailors and airmen have proved a great thing. They have proved that the Americans of our generation have all the courage and endurance and sacrifice and wit that Americans have had down through our fine years. . . . That is the great thing we have learned; that the attributes of pioneer Americanism can be gained amid a civilization of juke-boxes and jalopies, and even the WPA. Our boys, our greatest heroes tonight came to young manhood in a depression-nation. They were another lost generation. But they have found themselves, and withal they have found America again. And we have found America even though we have to stay at home."

Lawrence Martin, of the *The Denver Post,* believes that "Killing Nazis and Japs isn't pretty business—but neither is killing Americans. In 1943, we've got to kill Nazis and Japs faster than they can kill Americans. We've sent a million fighting kids to many fronts, right up against that horrible, detestable, stomach-curdling job. But it's not all THEIR job. It's a job for factory, farm, shipyard and every heart on the home front. It's the only way to victory in 1943 or any other time, and without victory, there's neither security nor value to life."

Out of Gas

Another editor repeated the incident from the near-tragic flight made by Captain Eddie Rickenbacker. "Captain Rickenbacker told us when his ship ran out of gas and was about to make its desperate landing in a rough sea how he and his gallant companions dropped everything that was loose on the ship, mail, tools, baggage, and equipment. "If you think material things are worth anything," said Captain Rickenbacker, "have that experience and you will find out how useless they are."

Dr. I. Q. (Jimmy McClain), the puzzler of many audiences, looks a little puzzled himself. He has had to call on his chief aide, Allen C. Anthony, who is trying to straighten out a puzzle in the script by simply looking over Jimmy's shoulder.

How Long Will War Last?

On the same evening's broadcast H. J. Haskell, editor of the *Kansas City Star,* told this story, in speaking of how long the present war will last:

Some British officers in the last war asked Marshal Joffre's chauffeur whether the marshal ever spoke of when the war might end.

"Often," the chauffeur replied.

"What does he say?" they inquired.

"He says, 'Josef, how long do you suppose this terrible war will last?' "

Waring Still Rehearses Theme Song

Even though you might think Fred Waring's musicians would be perfectly acquainted with their theme song, "Sleep," Fred has them rehearse the piece frequently.

"Sleep" did not emanate from Tin Pan Alley. While attending Penn State College, Waring happened to hear a Negro orchestra playing around with a tune "they just picked up somewhere."

"We dug around," says Fred, "and discovered the tune came from a composition called 'Visions of Sleep,' written by a blind Philadelphia organist by the name of Adam Geibel."

Fred arranged with the composer for its use; brother Tom wrote the lyrics, and the title was shortened to "Sleep." The song has been Waring's theme for 24 years.

This same Geibel is the author of hundreds of Sunday school hymns.

Nature has provided an ideal for military clothing experts to aim at, in endowing the *duck* with an all-weather protective covering, of ideal warmth yet light weight, thoroughly ventilated and impervious to moisture.

SCRAP STEEL—1000 POUNDS YOUR SPRING QUOTA!

Once again we are reminded by our Government that scrap iron and steel is urgently needed to win this war. The best source of the kind of heavy scrap needed seems to be farms. Three million tons is needed before June 30. That means an average of 1,000 pounds from every farm, big and little, in the U. S.

The best steel, the kind we need most of, is made by the open-hearth process. It is made half of scrap and half of pig-iron. By using scrap we not only get a better steel but we save enormous quantities of iron ore, coal and limestone and the immense amount of labor, machinery and transportation which would go into producing it and which just isn't available.

The scrap supply in industry is drying up. Since new machines are no longer available, the old ones are not being scrapped. Railroads are repairing cars instead of scrapping them. Old buildings are being used and not torn down. Much semi-finished steel is going to our allies. They finish it and use the scrap. Industrial scrap has been easier of access and much has been gathered up. Farms are now in a key position to help in this critical situation.

"Aralac" is a cloth made from casein extracted from skim milk. The fibre can be blended with wool, fur, mohair, cotton or rayon. It is being used extensively in the manufacture of felt hats.

Oiling Electric Motors

. . . . . (Here from page 12)

2. Apply a light coating of grease to the bearing. Never fill the bearing more than full.

3. Replace the bearing, with grease retainers, washers, springs, cover, etc., in the exact original positions.

Caution—In removing or replacing ball bearings do not pound on the shaft as this may seriously damage the bearings.

Figure 14, which is a grease packed bearing but with an oil cup, emphasizes the point that one should know his type of bearing and follow the manufacturer's instructions if he is not to go wrong and do injury to the motor. The difference in construction of bearings of the same type explains in part why some motors of the same power cost more than others.

NOTE: See inside back cover for motor oiling chart. List your own motors for oiling.

The climate of all the French territory in North Africa is similar to that of southern California.

Questions and Answers

Uses for ¼ hp Motor

▶ **Question:** *What labor saving devices can we arrange at small expense to drive with a ¼ hp motor? Ours is a dairy and general farm raising some grain, corn, hay, poultry and pigs.*

G. H. & B. H. K., New York

▶ **Answer:** Following are a number of uses to which a ¼ hp motor may be put with little expense. It may be used in the shop to turn an emery wheel, grindstone, drill press, small table saw, battery charger made from a discarded car generator. It may also be used to operate a small concrete mixer of 3 cu. ft. capacity, a seed cleaner or fanning mill, a one hole corn sheller, a feed grinder of small capacity such as a 4 in. burr mill, a feed mixer made of an old oil drum and several types of small grain elevators having capacities of up to 10 bushels per minute. Then it may also be used to turn a

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hand sausage grinder or ice cream freezer or a churn and may be used to operate pumps, including small centrifugal pumps for garden irrigation.

In most cases, all that will be needed to adapt the motor to hand operated equipment is pulleys of proper sizes and belts.

Rabbit Clippers

▶ **Question:** *Where can I get electric clippers suitable for shearing Angora rabbits?* H. F. V., Ind.

▶ **Answer:** So far as I know, there is no electric clipper made especially for shearing rabbits. If a horse or cow clipper would do the job, I would recommend the Chicago Flexible Shaft Company, 5600 W. Roosevelt Road, Chicago, Ill.

Other companies which make both electric hair clippers and animal clippers are the Andis Clipper Company, Racine, Wis., and John Oster Mfg. Company, Racine, Wis.

Battery Charger Speed

▶ **Question:** *What size pulley would you suggest for motor and car generator to charge batteries? Could cables be arranged to charge battery in the car without removing it.*

R. H., Ohio

▶ **Answer:** The generator taken from a car should be run at about 1,000 to 1,200 rpm to give the proper speed for battering charging. It does not have to be exact.

You can get this approximate speed by using the following combinations of pulleys. Using the small pulley on the motor and the larger on the generator. Two to three inches, two and one-half to four inches or three to four and one-half or five inches.

It will not be necessary to remove the battery from the car for charging. Just be sure to make your connections correctly.

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Gardner Hi-Line Controller

Save time, get set for more milk, beef or pork production with a Gardner hi-shock hi-line controller — the best engineered electric fence unit. Thousands are in nation-wide use, many have given six years of successful service. Ask your dealer today, or write direct for free folder.

For Sale Now!

Gardner Mfg. Co.
5343 Kansas St. Horicon, Wis.

Peripheral Speed for Grindstones

▶ **Question:** *I want to put an electric motor on our old style wet grindstone. Would like to know haw many feet-per-minute the circumference should travel for best results? Knowing this I will be able to compute the size of the pulleys.*

J. T. M., New York.

▶ **Answer:** The travel of the outer edge of your grindstone should be between 300 and 400 feet per minute. At speeds in excess of 400 feet there is a tendency to throw off water. For a 30 in. wheel this would be a speed of 51 rpm; for a 22 in. wheel, 70 rpm. and for a 26 in. wheel, 60 rpm.

The correct peripheral speed for emery wheels is 4,000 to 6,000 ft. per min. To give a contact speed of 5,000 ft. per min. with a 6-in. wheel, the grinder should turn at 3,180 rpm.

To Stop Cannibalism

▶ **Question:** *When our pullets were 4-5 months old they started pecking each other. When they drew blood, they continued to peck the bird to pieces. We tried putting them between the old hens and even tried painting the wall red. Now all the hens peck and we lose about ten each week. Any information on what to do will be appreciated.*

L. Z., Ill.

▶ **Answer:** The Poultry Departments of Illinois and New Jersey have supplied information for this answer. No one method can be guaranteed to work in all instances. The method which seems to be giving the most general success is to put 2 to 3% of salt in the mash in place of 1% and feeding that for 4 to 7 days then dropping back to 1%. Repeat later, if necessary. Or, put one tablespoon of salt to each gallon of drinking water for ½ day. Repeat after 3 or 4 days. It may not work if the habit is of long standing. Other helpful practices are: Feed whole oats in open hoppers; feed green feed like whole cabbage or beets, hung up so hens will have to jump to pick. "Specks" attached through the nostrils are sometimes used. Overcrowding may cause it. Give more room.

Auto Starter Motor on 110 Volts

▶ **Question:** *Can I make a motor out of a starter from an automobile to drive a generator for charging batteries? How is one made?*

H. G., Conn.

▶ **Answer:** Automobile starter motors use 6 volt direct current and it is not feasible to change them over to use 110 volt alternating current.

You can use the generator from an automobile for charging batteries if you will drive it at about 1,000 to 1,200 revolutions per minute. A ¼ hp electric motor would be a satisfactory power source for driving the generator. An old washing machine motor would do the job.

Gas to Saw Wood

▶ **Question:** *I have a 30-inch cordwood saw run by my half-ton truck which has a rear wheel pulley. Since gas is rationed I need to know how much I use for sawing. The motor must be run at 50 mi. per hour to get proper saw speed. Could you determine the amount of gas used per ten miles registered on the speedometer.* A. C. C., Va.

▶ **Answer:** There is only one way I know of to find out how much gasoline your truck motor uses in sawing wood and that is by trial. Different trucks or cars would use different amounts. The surest way would be to have an auxiliary tank holding just one gallon of gasoline and keep your sawing time while this gallon is being used.

As a pure guess based on probable horsepower requirements and efficiency, I would say you use between four and five quarts per hour. It is hard on your differential.

Freezer Size

▶ **Question:** *I am interested in a freezer-locker on the farm for two families. How big should it be? How can we get one?*

J. D. N., Md.

▶ **Answer:** I would say that for a two family freezer, you should have a box that would hold approximately 40 cu. ft. The size depends much upon the use which a family makes

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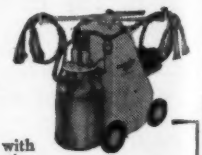

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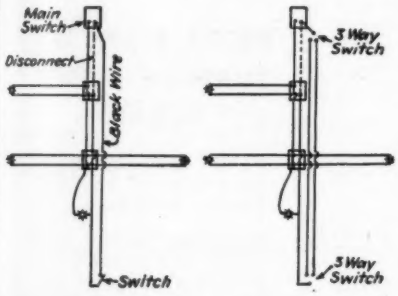
of the freezer. Some families get along with 16 cu. ft. capacity, but more of them will use from 25 to 40 cu. ft. and I know of some family freezers of 70 cu. ft. capacity.

You can also obtain plans and instructions for building a home-made cabinet by writing to Oregon State College, Corvallis, Oregon, for their bulletin and also the Washington State College at Pullman, Wash.

Switch for School House Lights

▶ **Question:** *Please give me a diagram of how I could put a switch in an electric circuit to turn the lights on at the door in a school house where the main switch is in the back of the school on the original wiring. Below is shown wiring as it is at present.* C. S., Ill.

▶ **Answer:** The diagram below gives the change in wiring necessary to control the lights in your school house from the front door. You



Left: Lights controlled at front door only. Right: Sketch showing necessary wiring to control lights at both front and rear of building.

should run the black or live wire from the main switch all the way to the control switch with a return wire to the nearest point where you can connect to the black wire of the lighting circuit. If you wanted to control the light by switches placed at both the front and back door, you would need an additional wire to run between the switches as shown in our August issue or as indicated in the separate sketch above.

Seed Germinator

▶ **Question:** *I intend to build a seed germinator about* 14x20x16 *inches with seed trays and a water pan in the bottom. Will use 2-60 watt heating elements and a brooder thermostat. How warm should it be run for flax, wheat, barley, oats, soybeans and corn? What material should I use in the trays? Would sawdust get enough moisture from the water pan to work?*

J. A. N., Minn.

▶ **Answer:** Seed germinators are usually held at around 80° F. If you have your sawdust in the trays thoroughly wet when you start and keep water in the pan, you will have plenty of moisture to keep the seeds in growing condition. You will probably have to replace the sawdust in the trays occasionally to get away from mold and mildew. I assume you will use muslin or some similar material on which to place the seeds over the sawdust and have spaces at opposite ends of the trays through which the heat can move up and across the trays.

Home Dehydrators; Drying Time

▶ **Question:** *Would like to know average time for drying different fruits and vegetables in a home dehydrator; also information on operation. I am building one.*

W. R. McC., Pa.

▶ **Question:** *How long does it take to properly dehydrate peas, lima beans, carrots and peaches? How long will dehydrated foods keep? What precautions must be taken in storing dehydrated foods?*

W. E. K., Md.

▶ **Answer:** You can get some very good information on the use of home-made food dehydrators from Extension Circular #709, which is available from the Extension Service, University of Nebraska, Lincoln, Neb. The bulletin is free.

It will take from six to twenty-four hours to dehydrate different products in the small electric home dehydrator. The time will depend on the amount of moisture in the product, the size of pieces, and the nature of the product itself. Peas and lima beans will dry quickly; peaches rather slowly. Dehydrated products will keep very well for a year and some of them almost indefinitely. After being dehydrated, they should be placed in sealed air-tight containers so they will not take up moisture.

Brooder Cost

▶ **Question:** *I would like to know*

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the price of an electric brooder of 300 to 500 chick capacity?

E. C., New York

▶**Answer:** Electric brooders of 350 to 500 chick capacity have sold for about $25 to $40. Brooders with metal hovers are no longer available. You can, however, obtain all the heating elements with fan, thermo control and attraction light, with plans for building your own hover of wood for about $20 from the Trumbull Electric & Mfg. Company, Plainville, Conn., or the Lyon Rural Electric Company, 2075 Moore Street, San Diego, Calif., or Greensboro, N. C.

Freezers Available?
Farm Service Connection
Availability of Welding Rods

▶**Questions from:** B. A. F., La.; Mrs. E. B., Ill.; C. C., Ohio.

▶**Answer:** Your questions and a number of others about equipment and line extensions are answered in the article on How to Get Service and Equipment on page 3.

1942 Index Available

A cross-referenced alphabetical index of all material in the 1942 issues of ELECTRICITY ON THE FARM is available to anyone who has kept his 1942 copies and would like an index. There is no charge. Just mail your request to ELECTRICITY ON THE FARM, 24 W. 40th St., New York, N. Y.

War construction reached a total of $12,145,059,000 in 1942,—more than double 1941, according to the Office of War Information. The peak of construction was reached in August with a dropping off each month since. Machinery and equipment deliveries are continuing to increase in volume.

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Names and addresses of manufacturers of the articles described in this column will gladly be furnished upon request to What's New Department, ELECTRICITY ON THE FARM, 24 West 40th Street, New York, N. Y.

Fibre Pipe and Conduit

A moulded fibre pipe impregnated with coal tar pitch is now available in sizes of 1" to 8" diameters and suitable for electric service through walls, concrete and underground in place of conduit; also for drainage or irrigation pipe, down spouts and sewage disposal systems. It weighs only 16 per cent as much as steel, can be cut with a saw, has taper sleeve drive joints with a tool for making them. It does not soften in water and will not contaminate potable water. It is not suitable for use under pressure. The price is about half that of Victory cast iron pipe and about twice as much as clay tile.

New Publications

(Publications are obtainable from the addresses given in the description. Some states make small charges for bulletins sent outside the state.)

• AN ALL-PURPOSE ELECTRIC BROODER. 8pp., illus. Exten. Circ. 239, Alabama Polytechnic Inst., Auburn, Ala. Plans, description, list of materials for a 150 chick, outdoor, lamp heated 500 w. brooder and runway.

• HOME-BUILT ELECTRIC BROODERS. 4pp., illus. Exten. Bul. 552, Cornell Univ., Ithaca N. Y. 48" square for 250-300 chicks. Commercial fan type or heat lamp heaters.

• HOMEMADE ELECTRIC BROODERS. 8pp., illus. Exten. Pub. C-195, Texas A. & M. College, College Station Texas. Plans and descriptions of 4 types of lamp, fan and resistance wire heated brooders for 75 to 400 chicks.

• SUNLIGHT LAMPS FOR LAYING HENS. Bul. 344, Exp. Sta., University of Nebraska, Lincoln, Neb. 8 pp., illus. Results on egg production, hatchability and mortality of S-1 and S-4 lamps in place of cod-liver oil on laying hens.

• OTHER CORNELL BULLETINS. Cornell Extension Service, Ithaca, N. Y. Bul. 534, The Farm Repair Shop. 4pp. Layout and requirements of a good farm shop.; Bul. 541, Care of Electric Motors. 8pp. illus. Bul. 521, Wise Use and Care of an Electric Refrigerator, 12pp., illus.; Bul. 519, Milking Machines, Washing and Care, 4 pp.

• HOW TO CARE FOR THE FEET OF YOUR HORSES AND MULES. 18pp., illus., Phoenix Mfg. Co., Joliet, Ill. Hoof formation, care of unshod horse, conformation of legs, need for shoeing, selection, preparation for and fitting of shoes, diseases of the hoof and treatment.

HERE'S HOW TO TURN IN YOUR SCRAP

FIRST pile up every piece of scrap iron and steel on your place.

NEXT sell it to a junk dealer. If you can't find one who will come and get it, call your County Agent, or your implement dealer, or your nearest newspaper, or your Local Scrap Committee. Donate it to some worthy organization if you like.

CLASSIFIED ADVERTISING

ELECTRICITY WITH THE LYON LINE can increase your production. Certain conditions, however, make prompt deliveries of some items impossible just now. Repairs and parts for homemade brooders are receiving special attention. Literature on electric poultry supplies is available. LYON RURAL ELECTRIC COMPANY, Dept. EF, Greensboro, N. C., or San Diego, California.

MOTORS, WELDERS, GENERATORS, FENCERS. Other electrical items. Priority unnecessary for Farmers. LEJAY MFG., 804 LeJay Building, Minneapolis, Minn.

REMINDER LIST OF EQUIPMENT TO BE OILED

CHECK LIST	Equipment	Mfgr. Recommends	JAN.	FEB.	MAR.	APR.	MAY	JUN	JUL	AUG.	SEP.	OCT	NOV	DEC.
Water systems														
Pumps														
Sump pump														
Washing machine														
Clothes drier														
Ironer														
Refrigerator														
Freezer														
Dishwasher														
Kitchen mixer														
Vacuum cleaner														
Kitchen ventilator														
Portable fans														
Attic fan														
Oil burner														
Coal stoker														
Blower and motor														
Sewing machine														
Electric shaver														
Separator														
Churn														
Ice-cream freezer														
Milking Machine														
Milk cooler														
Bottle washer														
Incubator														
Brooder fans														
Clippers														
Sheep shears														
Barn ventilating fans														
Irrigating pump														
Feed grinder														
Feed mixer														
Corn sheller														
Elevators														
Hoists														
Wood saw														
Tool grinder														
Lathe														
Battery charger														
Paint sprayer														
Other shop motors														
Portable motors														

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